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BENJAMIN SMITH BARTON

An American Naturalist

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Benjamin Smith Barton



ASSUME that our state (Pennsylvania) is dear to every inhabitant of it. It is not alone its material wealth which commands our admiration. We cannot fail to glory in its contributions to the great intellectual life of our country. It is the latter which led me to cast about for outstanding individuals, sons of the state, with whose lives and work we should be familiar. As a student of science, it was but natural that I should search for and emphasize men of our soil who towered aloft among their colleagues in this particular domain.

Not to occupy too much time in introducing one so prominent among his fellows as to deserve our attention, let me say that he was born in Lancaster County—the most fertile county among all the counties of all the states of our great Union. Writers everywhere have proclaimed it the Garden Spot of the United States. And, tramping over its surface or gazing upon its beautiful broad acres from automobile or car window, we have feasted our eyes in satisfaction upon its winning attractiveness and beauty. It is a county which makes one envious. It has produced scholars, warriors, statesmen and men

of affairs. I ought not, humanly speaking, say so much in its favor, for I am of the House of York—a wearer of the White Rose—but my personal jealousy fades into absolute nothingness when the evident superiority of the House of Lancaster looms forth so brilliantly in many diverse ways, and as we are contending for the greatness of the Mother State, county differences must and do sink into complete oblivion.

But to the man—the hero of this sketch—Benjamin Smith Barton. Why should his memory be revived? The answer is simple—he was a pioneer in science and a son of this splendid commonwealth. He was a pioneer in natural history—a pioneer in medical teaching and practice—a pioneer in botany. But before dilating upon these pioneer activities, let me refer to his ancestry and to those things in his early life about which everyone likes to know concerning men of note. Such knowledge often stimulates renewed effort in better living, in better thought and better action. The records, then, tell us that our subject was born in the “village of Lancaster”—“that opulent and comparatively ancient borough”—on the tenth day of February, in the year of our Lord one thousand seven hundred and sixty-six. He was one of

several children of Thomas Barton and Esther Rittenhouse, sister of the celebrated astronomer, David Rittenhouse. In passing, be it observed that when the latter was struggling heroically with his mathematical studies, Thomas Barton was a young parson, dropping in upon the Rittenhouse family not infrequently, and through Miss Esther learned of her remarkable brother, David, to whom he gave unstintedly of his knowledge and experiences in mathematical subjects. This is just a digression.

In time the Rev. Thomas Barton and Miss Esther were married and lived happily ever after on the banks of the Conestoga, where their own delightful home was shared with an interesting group of little people. The father was rector of the Episcopal parish in Lancaster.

Ever since I've been acquainted with the name Benjamin Smith Barton, I have been very curious in regard to the intermediate portion "Smith." What is its significance? I have asked time and time again, but no one seemed able to enlighten me. Recently, my inquisitiveness has been gratified. This is not a matter of moment, I concede, but it *is* interesting. It seems that the Rev. Thomas Barton was an intimate friend and ardent admirer of the Rev. Dr. William

Smith, the first Provost of the University of Pennsylvania, and so he introduced Smith between the names Benjamin and Barton. Further, the learned Provost baptized the little Benjamin.

Facts gleaned from the life of the Rev. Thomas Barton, tutor in the University of Pennsylvania from 1753-1754, indicate that he was an ardent student of nature—that he was intensely fond of botany and of mineralogy, and that upon even the youngest members of his family his studies made a deep impression, so that the little folks acquired a real taste for natural history, including plants and minerals. Benjamin especially showed a predilection for these particular subjects. How sad that at the age of eight years, he should lose his mother, who, like her husband, was intensely interested in the infusion of knowledge into the minds of her little ones. At fourteen years of age his father also was taken from him and Benjamin became an orphan. For a while friends cared for the children, but in 1780 Benjamin and one of his brothers went to York, Pennsylvania, where they attended an academy conducted by Dr. John Andrews, who later became Provost of the University of Pennsylvania. Benjamin proved an exceedingly diligent

and interesting student. He was very apt in all his studies. While devoted to natural science objects, he had great familiarity with the classics. He loved them intensely. This is clearly shown in a letter addressed to his Brother William, his senior. It is recorded in several places that Benjamin quite early in life exhibited an exceedingly fine ability in drawing. Some writers have said that his first lessons were received from the famous Major Andre, who was a prisoner at Lancaster. These instructions may have been continued in York, because it is well known that Major Andre was the guest of Dr. Andrews for quite a while, it being the desire of the good Doctor to have the stern old Whigs of that vicinity learn to know the Major, hoping thereby to make his punishment lighter or perhaps even gaining his freedom.

Barton's friends and intimates knew that he delighted in drawing. Once, when working in the western part of Pennsylvania with his uncle, David Rittenhouse, he said in a letter to his cousin, "Tell H—— she may depend upon the promise I made her to draw her a landscape and probably some other picture. I have already taken drawings of several curious and beautiful flowers, together with one of the falls of the

river Youh. This last I will send her as soon as safe opportunity offers."

"Besides his extreme naturalness, faithfulness and truth in the delineation of natural objects, more particularly of plants, by the pencil, he acquired great adroitness in the beautiful art of etching on copper."

After two years at the old academy in York, he went to live with his brother in Philadelphia. This was Brother William, and during his stay in the City of Brotherly Love carried on his collegiate work in the University of Pennsylvania, but did not receive his Bachelor's degree; probably, because he had become interested in medicine under the supervision of the renowned Dr. William Shippen. Then, too, his Uncle David desired his company on the expedition which had in view fixing the western boundaries of our state. One may imagine the delight which Benjamin had on this trip, for it brought him intimately in contact with the great plant life of the state. Further, he was thrown in with the "savage natives of this country." He gave his attention to their manners, their history, their medicines, so that what he afterward wrote in regard to them has commanded great respect among the learned.

There is a delightful little side-light which must find place here. Those interested in David Rittenhouse will welcome it. It shows how that noble and gifted soul entered intimately into the lives of those about him. Hear what Benjamin Smith Barton said of his uncle, "To me he was peculiarly dear. The most happy and profitable hours of my life were spent in his society. I followed his footsteps in the wilderness of our country, where he was the first to carry the telescope and to mark the motions and positions of the planets. In the bosom of his family I listened to his lessons as an humble disciple of Socrates or Plato; but to me he was more than a friend and preceptor: he was a father and upporter. He laid the foundation for what little prosperity in life I enjoy, and if it should ever be my fortune, either by labor or by zeal, to advance the progress of science or to reflect any honor upon my country, I should be the most ungrateful of men if I did not acknowledge and wish it to be known that it was David Rittenhouse who enabled me to be useful."

Some time in the summer of 1786, Barton went to Europe. Edinburgh was his destination. Having studied medicine in Philadelphia with graduates of Edinburgh, it was quite natural

that he should wish to continue under their masters. And so he devoted two years to study in that city, and as I write these words I am reminded that in letters to his Brother William he frequently spoke in the highest terms of Dr. Joseph Black. The mere mention of this name—Joseph Black—or any reference to him in a text, brings almost immediately to me the recollection that he was really one of the fathers of the science of chemistry. Joseph Black was a pillar of the science. It was he who told us of the difference between the fixed alkalies and their carbonates. It was he who first called attention to latent heat. But I must not digress too far. There is the temptation to do it, because Benjamin Smith Barton, later a professor in the University of Pennsylvania, was an actual student of the immortal Black, whose memory we of the guild of chemists cherish and try to dream the wonderful things which he actually accomplished.

Apparently it was not medicine alone that Barton studied in Edinburgh, for natural history occupied much of his time. Young as he then was, he obtained from the Royal Medical Society of Edinburgh—of which he was admitted a member before he had been a year in the city—

“an honorary premium for his dissertation on the *Hyoscyamus niger* (black henbane). It was the Harveian prize.” During his stay in Edinburgh he visited the great metropolis, London, and, busy as usual, while there put in print a fasciculus entitled “Observations on some parts of Natural History.”

We come next to a chapter in his life which writers seem to find a little disturbing, for in a letter of February 2, 1789, addressed to his Brother William, Barton tells of his determination to complete his medical studies at the University of Goettingen in Germany. The disturbing factor is why he should change, having been so well satisfied with his work in Edinburgh, having reached a point where he was prepared to take his final examinations and having made a deep and favorable impression upon his professors. A nephew of Benjamin Barton ascribes it to a feeling on the part of Benjamin that several of his professors in Edinburgh were far from fair to him, and so, fretting under the failure of proper recognition, he concluded to go to Goettingen, and it is from that university he received his degree of Doctor of Medicine in 1789. It has always been thought that he was the first American to receive the doctorate from a

German university. As the writer and a number of his friends are graduates of that venerable and celebrated institution, they have taken pains to ascertain just when Barton was there. This search was made most carefully by Dr. D. B. Shumway, who examined the rolls of the University of Goettingen from its beginning down to the present. He failed to discover the name of Benjamin Smith Barton as having been at any time enrolled as a student in the university. Against this stand the representations made by a nephew of Barton's that he was there, and also the letters to his Brother William, which declare that he was there and that he received his doctorate. It may be, in the case of Goettingen, as has been the case in many other universities, that the records were not always kept with the utmost care, and perhaps the fact that this stray foreigner had entered the university for the purpose of instruction was not regarded as anything remarkable, hence no note was made of it. Later, of course, Goettingen, like every other German university, seemed to take particular pride in calling attention to its foreigners, and especially Americans, who had received the doctorate or had been students in various departments of the university.

But let us observe his activity in the City of Philadelphia. The years of his preparation have passed and in 1789 the trustees of the University of Pennsylvania instituted a Professorship of Natural History and Botany. They chose Dr. Barton to fill this chair. He was then but twenty-four years of age, and was the first teacher of natural science in this Western Hemisphere. This is one of the facts which I trust will cling to our memory—that he was the first teacher of natural science in this Western Hemisphere. No mean honor for a son of the soil of Pennsylvania. This position he held for a period of six-and-twenty years. A writer thus comments on the work of that period: "During this period, Dr. Barton delivered twenty-five courses of lectures on botany, in which he inculcated a high sense of the real benefit of the pursuit from a medical point of view with an enthusiasm that gave unequivocal evidence of his attachment to the interests of the science and the honor of the University. Such was the success of these efforts that during the period when the laws of the University rendered it obligatory upon the candidates for its honors to print their inaugural theses, not one Commencement was held without a number of dissertations being

published detailing experiments on the medicinal properties and effects of indigenous vegetables, most of them undertaken at the instance and prosecuted under the auspices of Dr. Barton. The authors of these theses were annually scattered through different sections of the United States. Many of them cherished the love of botanical pursuits which they had imbibed here—they became botanists—and thus have the exertions of Dr. Barton been seen and felt beyond the precincts of the University."

Surely it was the spirit which prompted these studies that led Barton, some years later, to give to the world his "Elements of Botany," a copy of the first edition of which lies before me. On the title page of this volume is written the name of Philip Syng Physick. I wonder whether you can imagine my feelings when I first looked at this title page and there saw the two names Barton and Physick? Barton later declared to be the Father of American *Materia Medica*—and Physick, his pupil, called in after years the Father of American *Surgery*!

In the preface of this old Botany there are certain sentences which may well be quoted. For instance, Barton at one place says: "I still look forward with an ardent satisfaction

to the time when natural history shall be taught as an indispensable branch of science in our University; when it shall cease 'to yield its laurels to languages which are withered or dead, and to studies that are useless or ignoble.' " What would Barton say could he see our present splendid Botanic Garden of five acres, could he inspect the herbaria stored away in Biological Hall, could he roam through the work rooms and halls of the Laboratory of Zoology, could he behold the provisions made for the teaching of chemistry and physics, and many other of the sciences? And he continues: "The work is now presented to the public. I cannot but be somewhat solicitous about it; I cannot dismiss it with frigid tranquillity, but I will not tremble for its fate. . . . The classical reader will not, I think, be displeased with my frequent references to passages in the works of the Roman writers, particularly their poets. I have introduced these passages because they often serve to illustrate my subject and because they cannot fail to enliven it. Although I am of opinion that in many of the American seminaries of learning the study of the languages of ancient Greece and Rome has occupied too large a share of the time and attention of youth, to the exclu-

sion of more important studies, I am far from coinciding in sentiment with certain American writers, who have labored to effect the complete banishment of these languages from our schools. An entire neglect of the Latin language, in particular, will emphatically mark the era of the decline of genuine taste among a people."

He then tells how the greater number of the plates illustrating the work were engraved from the original drawings of Mr. William Bartram of Kingsessing, in the vicinity of Philadelphia, adding: "While I thus publicly return my thanks to this ingenious naturalist, for his kind liberality in enriching my work, I sincerely rejoice to have an opportunity of declaring how much of my happiness, in the study of natural history, has been owing to my acquaintance with him; how often have I availed myself of his knowledge in the investigation of the natural productions of our native country; how sincerely I have loved him for the happiest union of moral integrity, with original genius and unaspiring science, for which he is eminently distinguished. 'Sero in coelum redeat.' "

This early Botany appeared in two volumes. Indeed, it was republished abroad and translated into foreign languages.

Years ago, the writer studied botany in the text-books of Wood, Gray and others, but on leafing over the Barton "Elements," he has been deeply impressed with the minute descriptions of the parts of plants, as well as by the variety of information. Perhaps this may be regarded as superfluous; yet one cannot help thinking that it is just this variety which broadens the horizon of the student and makes plainer to him the importance, the ramifications and the magnitude of his subject. In later editions of Barton's monumental work, notably that of the year 1836, this explanatory, collateral material has been omitted. Not to weary you, but merely to indicate how, in the descriptions of the parts of plants, Barton was prone to dilate, note this in his comment upon the seed:

"The fertility of nature in the production of seeds is almost incredible, and is a circumstance well calculated to display the unbounded liberality of nature and the immense quantity of life that may spring from a solitary embryo. A single stalk of Indian Corn (*Zeta Mays*) produced in the summer 2,000 seeds; in the same period, a plant of Elecampane (*Inula Helenium*) produced 3,000 seeds; the Common Sunflower (*Helianthus annus*) 4,000; the Poppy, 32,000.

A single spike of Cat's-Tail (*Typha*) produced 10,000 seeds and upwards. A single capsule of the Tobacco was found to contain 1,000, and one of the White Poppy (*Papaver somniferum*), 8,000 seeds. Each capsule of the Vanilla contains from 10,000 to 15,000 seeds! Mr. Ray informs us, from actual experiments made by himself, that 1,012 Tobacco seeds are equal in weight to one grain; and that the weight of the whole quantity of seed in a single stalk of Tobacco is such that the number of seeds, according to the above-mentioned proportion, must be 360,000. The same learned naturalist estimates the annual produce of a single stalk of Spleen-wort (*Asplenium*) to be upwards of one million of seed. Dr. Woodward has calculated that a single Thistle seed will produce at the first crop, 24,000 seeds; and, consequently, five hundred and seventy-six millions of seeds, at the second crop! Well might Virgil say that the Thistle become 'dreadful in the corn-fields.' "

Barton was not only an independent worker in botany, but, as shown in a previous paragraph, inspired his students to pursue the subject, and even went further; for he interested himself in all persons who had an inclination toward the subject. Thus two names cherished

by all botanists, namely, Frederick Pursh and Thomas Nuttall, were among those of his friends, toward whose success as botanists in the study of American plants he contributed very generously. Pursh, indeed, credited him with having supplied the funds which made possible a botanical excursion which carried him through the mountains of Virginia and Carolina and along the coast lands. Barton fostered the zeal of Nuttall, gave him free access to his home and to his books, and financed an expedition in 1810 through the north and northwestern parts of the United States and the provinces of Canada. "Among a very considerable number of plants which Nuttall observed and collected in the course of this journey, there were two species of the genus which he observed had the aspect of cactus. He named this genus *Bartonia*. The first specimen he termed *Bartonia superba*, the other *Bartonia polypetala*. He spoke of *Bartonia superba* as a plant three feet high, whose splendid flower expanded only in the evening, suddenly opening after remaining closed during the day, and diffusing a most agreeable odor."

Having met with such remarkable success in the teaching of natural history and botany, about the year 1796, when just thirty years

of age, Barton was chosen to the chair of *Materia Medica*. His labors in this subject were most important. It was in this particular field that he began and won for himself the high professional reputation obtained by him in medicine. Further, there can scarcely be a doubt but that now his profound knowledge of botany caused him to develop the subject of *Materia Medica* on broader lines. This is evidenced by the publication of his "Collections for an Essay toward a *Materia Medica* of the United States," in the first volume of which appear these words: "I hope the following pages will be received as an earnest of my desire to extend our knowledge of the medicinal properties of the indigenous vegetables of the United States. . . . I shall pursue my inquiries concerning the nature and properties of the natural productions of my native country; I shall pursue them because there is at least a possibility that they may ultimately tend to something useful. . . . Already have I had the satisfaction to perceive the useful tendency of my labors. . . . It is not one of the least pleasurable circumstances of my life that I have been in some degree instrumental in directing the medical students of the United States to a few of these objects which

have since solicited their attention." To enter into detail on this subject would doubtless tire you, so it may be dismissed with these words—these Collections of Barton are the beginning of an American *Materia Medica*, hence he was justly called the Father of American *Materia Medica*, an honor which no one has hesitated to give him, and when the student has patiently labored through the many tomes which have been written upon the medicinal properties of plants, he will not fail to speak with profound respect of and admire his countryman Barton for laying the foundations of this particular division of medical science.

In 1797 Barton married a Miss Pennington. To them were born a son and a daughter.

Barton's remarkable contributions and his universal recognition as a teacher of power contributed largely to his appointment to a vacancy created by the death of Benjamin Rush. It was the appointment to the chair of the Practice of Physic. This Barton regarded as a distinct promotion, and, therefore, intended to hold that of natural history and botany but a year or two longer, as he was desirous of directing his whole mind to the fulfilment of the duties of his new professorship. He delivered but two

courses of lectures in the Practical Chair, "when his increasing ill health forced him to have recourse to a last resort to renovate his constitution. I mean a sea voyage. He accordingly embarked for France in the month of April, 1815, and returned by the way of England in November, feeling not benefited by his too hasty travel and return. He expired on the 19th day of December, 1815."

Let us pause a moment. Just one hundred years ago occurred the sad event recorded in the last paragraph, and as I sit with many of the works of the great Barton about me on table, chair and floor, I feel that my story, as outlined for you, is sadly incomplete.

Turning to one of the volumes close at hand, I noticed that it bore the title, "The Philadelphia Medical and Physical Journal," and slowly turning its pages, I observed that it was to appear regularly every six months, that it was to bring original contributions to its readers on branches of medicine, natural history and physical geography, together with reviews and miscellaneous facts of various kinds, many of them from the hand of our friend Benjamin Smith Barton, the indefatigable editor. Among others appear these words:

“The Editor of this Journal has made very considerable progress in his anatomical and physiological inquiries concerning the Common Opossum of North America, to which he has given the name of *Didelphis Woapink*; Woapink being one of its Indian appellations. He designs to publish his inquiries in two distinct memoirs, which will be embellished, and rendered more useful, by a number of fine engravings, representing the progressive evolution of the parts of the embryo, etc. An abstract of the second memoir, which is restricted to the *marsupial* and *dorsal* gestation of this singular animal, has been transmitted to Mr. Roume, of Paris, by whom, it is probable, it will be published.

“In the course of his inquiries, many important circumstances respecting the natural history of the opossum have been brought to light. Among others, the final intention of nature in the formation of the marsupium, or pouch, seems to be satisfactorily ascertained.”

And again, Barton records: “Elephantine bones, of two distinct species, continue to be found in various parts of North America. A large grinder of the species improperly called **Mammoth**, or **Mammouth**, has lately been found, in a field, at the distance of a few miles from

Chambersburg, in Pennsylvania, and is in the Editor's possession. A tooth of the same species has been discovered near the mouth of Buffaloe Creek, in the State of New York, nearly in latitude 43. Of the other species, which appears to be nearly allied to (if, indeed, it be not the same with) the mammoth of Asia, specimens have been discovered in Kentucky, in South Carolina, etc. This species (or rather its defense, or tusk) has given its name, among some of the Indian tribes, to a considerable branch of the river Susquehanna. The Indians imagine that this defense is the horn of some large animal; some of them say the horn of a Snake."

The mastodon was an object to which Barton gave much thought. One of his most attractive letters upon this subject was addressed in 1810 to Thomas Jefferson. If it were not so long I would include it; suffice, however, to mention that it indicates the keen, penetrating faculty of our naturalist.

All epicures will be interested in the next lines: "The Canvass-Back has been killed at Columbia (on Susquehanna) and has been seen by Mr. R. of Delaware, by a clergyman from the Eastern shore of Maryland, and others, who all pronounce it to be, unquestionably, the *real*

Canvass-Back. These birds have been killed at, and above, Columbia before, but were never known to frequent the River so high up, in larger numbers, until last winter.

"The clergyman, alluded to, told me, he supposed, that the freshets in the creeks and inlets, last year, must have destroyed the root upon which they feed, in their usual feeding places, and induced them to go higher up the river, in pursuit of it; and having found it there, it is not improbable that they will visit us every winter.

"I have not been able to ascertain, that they eat anything besides this root. Their superior flavour is attributed to their living wholly on it, and the circumstance of their leaving their usual feeding places, and coming so far in search of it, seems to strengthen this opinion."

"The Canvas-Back here spoken of, and so much admired, as an article of food, in the United States, is the *Anas ferina* of Linnæus; the *Anas Penelope* of Brisson. It is, also, a native of Britain, where it is known by the names of Pochard, or Dun-Bird, Great Red-headed Wigeon, etc. The plant whose root is said to be the favourite food of this species of duck, is a species of the singular genus of

Vallisneria, which I have called *Vallisneria americana*, and concerning which I have read a memoir to the American Philosophical Society. Perhaps, it is the *Vallisneria americana* of Michaux."

Matthias, Benjamin's elder brother, was also keenly alive to the natural history of his country. He had acquired a mass of original material relating to quadrupeds, birds and fishes. He also made a large collection of the minerals of Pennsylvania, which later fell into the hands of Benjamin. He painted after nature, and his drawings, especially those of the birds and fishes of Pennsylvania, are acknowledged to be some of the most beautiful in natural history.

Another exceedingly interesting contribution by him is an article on "The Fascinating Faculty of the Rattle Snake." This paper made such a profound impression upon naturalists that it was translated by the eminent German scientist Zimmerman.

I have said that there are about twenty-five separate volumes or books bearing the name of Benjamin Smith Barton upon their title pages together with a goodly list of papers and memoirs presented to the American Philosophical Society of which he was for many years an honored

vice-president and active member. In the Encyclopedia Britannica it is incorrectly stated that he was president of this society; which statement has gone into the general print. Rittenhouse and Thomas Jefferson were the presidents of the society during Benjamin's membership.

In 1780 the University of Pennsylvania conferred the degree of Master of Arts upon this distinguished member of its faculty, who had produced such a profound impression for learning throughout the whole world.

One is almost overwhelmed by the variety and extensive knowledge of Benjamin Smith Barton. It is impossible to adequately represent his activities in a sketch such as this. He is said to have been a man of extraordinary industry, of quick perception, remarkable, tenacious and faithful memory, good judgment, vivid imagination, eloquent and instructive as a teacher, profound in research. He was, however, lacking in method, and in writing he was rather diffuse. As a physician he was credited with being quick in diagnosis, although extremely cautious as a practitioner. He was a patriot with an unaffected love of his country. He was tall in figure and well formed, with a remarkably fine

